AMENDMENTS TO THE CLAIMS

1. (Currently amended) An optical device for providing optical amplification, comprising :

[[-]] a substrate[[,]]; and

[[-]] a photo-definable polymer structure formed on the substrate in a shape defined by a number of sidewalls, n, and being doped with an optically active medium, wherein the sidewalls of the structure form a cavity resonator so that an electromagnetic wave ~~upon pumping of the device~~ is emitted laterally upon pumping of the device.

2. (Currently amended) An optical device ~~for providing optical amplification comprising~~

~~a substrate, and~~

~~a photo-definable polymer structure formed on the substrate in a shape defined by a number of sidewalls, n, and being doped with an optically active medium~~ according to claim 1, wherein the shape and/or at least one material provided at least along a part of at least one sidewall of the structure are selected so that ~~an~~ the electromagnetic wave propagating in the structure will experience total internal reflection when incident on no more than n-1 sidewalls.

3. (Currently amended) An optical device according to ~~claims~~ claim ~~1 or~~ 2, wherein the electromagnetic wave propagating in the structure is incident at the no more than n-1 sidewalls at an angle greater than a critical angle.

4. (Currently amended) An optical device according to ~~any of claims 1-3~~ claim 1, wherein total internal reflection is obtained by providing the first material along a first number of sidewalls and providing a second material along a second number of sidewalls, the first and second materials and the angles between the sidewalls being selected so as to provide total internal reflection due to an incident angle of a propagating electromagnetic wave being greater than the critical angle for a propagating electromagnetic wave incident on the first number of sidewalls, whereas the second material is selected so that the propagating electromagnetic wave incident on the second

number of sidewalls are incident under an angle being less than the critical angle, so as to allow for outputting an electromagnetic wave from the second number of sidewalls.

5. (Currently amended) An optical device according to ~~any of claims 1-4~~ claim 1, wherein a second material is provided along at least a part of at least one sidewall for allowing for emission of an electromagnetic wave from the structure, wherein the shape is rectangular, and wherein the critical angle of the at least part of the at least one sidewall is altered due to the presence of the second material.

6. (Currently amended) An optical device according to ~~any of claims 1-5~~ claim 1, wherein the emitted or the propagating electromagnetic wave is a single mode electromagnetic wave.

7. (Canceled)

8. (Currently amended) An optical device according to claim 1 ~~or 7~~, wherein the length of the cavity resonator is on the order of the wavelength of the emitted or the propagating electromagnetic wave.

9. (Currently amended) An optical device according to ~~any of claims 1, 7 or 8~~ claim 1, wherein the wavelength of the emitted electromagnetic wave is determined as a function of concentration of optically active medium in the polymer and resonator cavity length.

10. (Currently amended) An optical device according to ~~any of claims 1-9~~ claim 1, wherein the photo-definable polymer is definable by ~~photo-lithography~~ photolithography.

11. (Currently amended) An optical device according to ~~any of claims 1-10~~ claim 1, wherein the device comprises an array of cavity resonators.

12. (Previously presented) An optical device according to claim 11, wherein at least two cavity resonators in the array are coupled.

13. (Currently amended) An optical device according to ~~any of claims 1-12~~ claim 1, wherein the shape is circular or elliptical.

14. (Currently amended) An optical device according to ~~any of claims 1-13~~ claim 1, wherein the photo-definable polymer is a negative tone resist.

15. (Currently amended) An optical device according to ~~any of claims 1-13~~ claim 1, wherein the photo-definable polymer is epoxy based.

16. (Currently amended) An optical device according to ~~any of claims 1-15~~ claim 1, wherein the polymer is photo-definable by an electromagnetic source having a wavelength above 250 nm.

17. (Currently amended) An optical device according to ~~any of claims 1-16~~ claim 1, wherein the polymer is photo-definable by an electromagnetic source having a wavelength of about 370 nm (i-line).

18. (Currently amended) An optical device according to ~~any of claims 1-17~~ claim 1, wherein the optically active medium comprises organic compounds, rare earths~~, such as Erbium~~, nanoparticles, or ~~quatum~~ quantum dots.

19. (Currently amended) An optical device according to ~~any of claims 1-17~~ claim 1, wherein the optically active medium is a dye with a concentration in the polymer above ~~1,1~~ 1.1 $\mu mole/cm^3$.

20. (Currently amended) An optical device according to ~~any of claims 1-19~~ claim 1, wherein the substrate is a metal substrate, a semiconductor substrate, a ceramic substrate, a glass substrate, ~~such as a Pyrex substrate~~ or any combination ~~of such materials~~ thereof.

21. (Currently amended) An optical device according to ~~any of claims 1-20~~ claim 1, wherein the structure has a height above 2 μm.

22. (Currently amended) An optical device for providing optical amplification, ~~the device comprises~~ comprising:

[[-]] a substrate[[,]]; and

[[-]] a photo-definable polymer structure formed on the substrate in a shape defining a cavity resonator and being doped with an optically active medium.

23. (Currently amended) An optical device according to ~~any of claims 1-22~~ claim 1 or 22, wherein the photo-definable polymer is SU-8.

24. (Currently amended) A method of manufacturing an optically active medium, the method comprising the steps of:

[[-]] providing a substrate[[,]];

[[-]] providing a photo-definable polymer ~~being~~ doped with an optically active medium on the substrate[[,]]; and

[[-]] defining a shape of a cavity resonator in the photo-definable polymer by photolithography.

25. (Previously presented) A method according to claim 24, wherein the step of providing the photo-definable polymer on the substrate comprises the step of spin-coating the substrate with the photo-definable polymer being doped with an optically active medium.

26. (Currently amended) A method according to claim 25, wherein the step of defining the structure comprises the steps of:

[[-]] exposing the spin-coated polymer in a predetermined pattern[[,]]; and

[[-]] developing the predetermined pattern to form at least one polymer structure.

27. (Previously presented) A method according to claim 26, wherein the step of defining the structure further comprises the step of soft-baking the polymer prior to the exposing step.

28. (Currently amended) A method according to ~~claims 26 or 27~~ claim 26, wherein the step of defining the structure further comprises the step of post exposure baking the polymer after the exposing step.

29. (Currently amended) A method according to ~~any of claims 26-28~~ claim 26, wherein the step of developing comprises the step of using a wet developer for developing the pattern.

30. (Currently amended) A method for laterally emitting an electromagnetic wave, ~~the method comprises~~ comprising the steps of :

[[-]] providing a photo-definable polymer ~~being~~ doped with an optically active medium on a substrate[[,]];

[[-]] defining a shape of a cavity resonator in the polymer by exposing the polymer to optical radiation[[,]];

[[-]] developing the exposed polymer to obtain at least one structure in the polymer[[,]];

[[-]] pumping the structure by a pump source so as to provide activation of the optically active medium[[,]]; and

[[-]] laterally emitting an electromagnetic wave.

31. (Currently amended) A micro system comprising at least one optical device according to ~~any of claims 1-23~~ claim 1 or 22.

32. (Previously presented) A micro system according to claim 31, further comprising at least one waveguide channel.

33. (Currently amended) A micro system according to claim ~~31 or~~ 32, wherein the at least one waveguide channel and the polymer structure of the optical device is fabricated ~~in~~ from the same polymer material.

34. (Currently amended) A micro system according to ~~any of claims 31-33~~ claim 32, wherein the polymer structure is provided so that an output of the polymer structure is coupled directly into the polymer waveguide channel.

35. (New) The optical device according to claim 18, wherein said rare earth is erbium.

36. (New) The optical device according to claim 20, wherein said glass substrate is a Pyrex substrate.